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EVALUATION of Feed Plant Operations, Plains Cooperative Oil Mill, Lubbock, Texas

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UNITED STATES DEPARTMENT OF AGRICULTURE
FARMER COOPERATIVE SERVICE
WASHINGTON, D.C.

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The Service (1) helps farmers and other rural residents obtain supplies and services at lower cost and to get better prices for products they sell; (2) advises rural residents on developing existing resources through cooperative action to enhance rural living; (3) helps cooperatives improve services and operating efficiency; (4) informs members, directors, employees and the public on how cooperatives work and benefit their members and their communities; and (5) encourages international cooperative programs.

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SUMMARY AND RECOMMENDATIONS

Plains Cooperative Oil Mill (PCOM) produced 14,383 tons of feed during the 1970-71 season (fiscal year ending June 30, 1971). Mixed feed (customer formula) accounted for 76 percent of sales; sacked sweet feed and sacked 20/80 mix for 14 percent and 10 percent, respectively.

Net margins from feed plant operations were \$19,844 before and \$11,094 after depreciation. The feed plant was operated at 35 percent capacity during 1970-71.

Costs and returns were projected for utilization of 50, 75, and 100 percent plant capacity. Processing costs per ton of feed before depreciation declined from \$4.20 at 35 percent utilization to \$2.55 at 100 percent utilization. Net margins before depreciation increased from \$19,844 at 35 percent plant utilization to \$124,109 at 100 percent based on a gross margin of \$5.58 a ton realized in 1970-71.

Net margins are affected by revenue factors as well as costs. This report projected net margins with prices \$1 a ton above and below 1970-71 prices. To realize the same net margins at prices of \$1 a ton below 1970-71 prices would require a 35 percent increase in production, from 14,383 to 19,359 tons. Similarly, at \$1 a ton above 1970-71 prices, the same net margins could have been realized from 11,489 tons or a 20 percent decrease in production. With no change in sales volume, prices of \$1 a ton above 1970-71 net margins would have increased from \$19,844 to \$34,085 or by 72 percent.

If PCOM's goal is to increase net margins from its feed plant, one alternative is to put a volume discount pricing policy into effect. For example, feed in sale lots of less than 5 or 10 tons could be increased \$1 or \$2 above 1970-71 prices and sales above 5 or 10 tons given a \$1 discount.

The extent to which prices should be raised depends on how sales volume would be affected. If sales dropped after price increases to the extent that it became apparent net margins would decrease, prices could be reduced.

Any action PCOM may want to take on such a pricing policy would need to be kept within Government price regulations if in effect. There are also other considerations such as the feed plant providing an additional market for cottonseed hulls and meal.

In 1970-71, PCOM marketed 6,694 tons of hulls and 1,441 tons of cottonseed meal through feed accounting for 10 percent and 1 percent of total production. In some years when hull supply is relatively high and prices low, a 10 percent increase in volume may have a significant effect on price. For example, PCOM marketed 66,098 tons of hulls in 1970-71 of which 6,694 tons were through the feed plant. If the feed plant was not operated and the additional hulls resulted in a \$1 a ton decrease in price of hulls, then net margins for overall mill operations would decline by \$66,098.

Local farmers should be considered in making decisions regarding feed plant operations. The reasons they patronize PCOM could include the desire to do business cooperatively; or that feed mixing services are not available locally; or, if available, prices are higher or service is less satisfactory.

If feed plant operations are discontinued or price increases put into effect, it would be well to inform patrons of the reasons for the decisions.

EVALUATION OF FEED PLANT OPERATIONS,
PLAINS COOPERATIVE OIL MILL,
LUBBOCK, TEXAS

by Elmer J. Perdue

Plains Cooperative Oil Mill (PCOM) Lubbock, Tex., a large-scale regional with more than 120 cooperative cotton gin members, receives and processes 250,000 to 350,000 tons of cottonseed annually. In addition it has been processing an increasing tonnage of soybeans. The feed plant operation is a sideline activity and represents 3 to 4 percent of total sales.

In a letter to Farmer Cooperative Service, management of PCOM requested a feasibility study of their feed plant operations in conjunction with their overall milling. Primary objectives of the study were to determine costs, margins, and returns for feed plant operations during the 1970-71 season and to project returns for various levels of production with the present feed plant capacity.

Market potential for types of feed produced by PCOM and projected costs and returns for increased plant capacity were not studied due to underutilization of present capacity. However, this report does suggest methods of testing market demand through alternative pricing arrangements.

KINDS OF FEED PRODUCED

PCOM produces three basic feeds. These are customer formula mixes; sweet feed (a mixture of 10 percent molasses, 20 percent cottonseed meal and 80 percent cottonseed hulls). A variation of

20/80 is 10/90 which contains 10 percent cottonseed meal and 90 percent cottonseed hulls.

Separate ledger accounts are kept for sales of sacked sweet feed, sacked 20/80, and mixed feed. Bulk sweet feed and bulk 20/80 and 10/90 are included with customer formula mixes in the mixed feed account.

Volume and sales for each of the three feed accounts for the 1970-71 season (fiscal year ended June 30, 1971) were:

Kind of feed by sales accounts	Volume		Sales	
	Tons	Percent	Dollars	Percent
Mixed feed ^{1/}	11,012	76	444,596	74
Sacked sweet feed	1,983	14	97,017	16
Sacked 20/80 mix	<u>1,388</u>	<u>10</u>	<u>63,063</u>	<u>10</u>
Total	14,383	100	604,676	100

^{1/} Includes bulk sweet feed, bulk 20/80 and 10/90 mixes.

Approximately 90 percent of mixed feed sales was customer formula mixes; and 10 percent bulk sweet feed, bulk 20/80 and 10/90 mixes. Customer formula feed generally contains cottonseed hulls, cottonseed meal, grain, and molasses along with traces of vitamin A and salt. In 1970-71, mixed feed averaged 61 percent cottonseed hulls, 20 percent grain, 13 percent cottonseed meal, and 6 percent molasses.

Sales of sacked sweet feed and sacked 20/80 were 1,983 and 1,388 tons, respectively. Bulk sales of these feeds, based upon approximately 10 percent of the mixed feed account, would be around 550 tons each.

Data on monthly volume, average sales prices, and cost of ingredients are given in appendix tables 1, 2, and 3 by type of feed.

Most of the feed produced by PCOM is sold in small lots. Based on a sample of every fifth sales ticket drawn from the mixed feed account, 79 percent of sales were in lots of less than 5 tons, 15 percent were in the 5-10 ton range, and only 6 percent were in lots of over 10 tons.

Sales tickets were not examined for sacked sweet feed and sacked 20/80. However, average daily sales based on monthly totals shown in appendix tables 2 and 3 ranged from 4 to 9 tons for sacked sweet feed and from 2 to 8 tons for sacked 20/80. The pattern is similar as for mixed feed.

COSTS AND RETURNS, 1970-71

This section discusses costs and returns for feed plant operations during the fiscal year ended June 30, 1971.

Table 1 is a detailed statement of operations and margins. Feed volume was 14,383 tons. Sales were \$604,676; cost of ingredients and sacks were \$491,778 and \$32,591 respectively; operating costs and expenses were \$69,213 leaving net margins of \$11,094 or \$0.77 a ton for the year.

Gross Margins

Gross margins for the year were \$80,307.

Grain and molasses were charged into the feed plant at average prices paid for these ingredients during the year. Costs and prices

Table 1.--Operating statement, feed plant, Plains Cooperative Oil Mill,
July 1, 1970-June 30, 1971

Item	:	:	: Cost of sales		: Gross margin	
			: Ingre-	: Sacks	: Total	: Per
	:	:	: dients	:	:	: ton
Mixed feed ^{1/}	11,012	\$444,596	\$378,693	\$10,849	\$55,054	\$5.00
Sacked sweet feed	1,983	97,017	67,948	12,790	16,279	8.21
Sacked 20/80 mix	<u>1,388</u>	<u>63,063</u>	<u>45,137</u>	<u>8,952</u>	<u>8,974</u>	<u>6.47</u>
	14,383	\$604,676	\$491,778	\$32,591	\$80,307	<u>2/</u> \$5.58
<u>Costs and expenses:</u>			<u>Total</u>	<u>Per ton</u>		
Mixer operators ^{3/}			\$21,104	\$1.47		
Sacking crews ^{3/}			15,891	1.10		
Supervision ^{3/}			2,544	.18		
Office salaries ^{4/}			2,380	.16		
Electric power			1,258	.09		
Property taxes			1,830	.13		
Insurance			1,290	.09		
Repair parts			5,000	.35		
Repair labor ^{3/}			6,360	.44		
Feed licenses			1,438	.10		
Miscellaneous			900	.06		
Interest on grain inventory			<u>468</u>	<u>.03</u>	<u>60,463</u>	<u>4.20</u>
Net margin before depreciation					\$19,844	\$1.38
Depreciation			<u>\$ 8,750</u>	<u>\$.61</u>	<u>8,750</u>	<u>.61</u>
Net margin after depreciation					\$11,094	\$0.77

^{1/} Includes approximately 90 percent customer formula feed and 10 percent bulk sweet feed, 20/80 and 10/90 mixes.

^{2/} Average gross margin for all feed.

^{3/} Includes 27.2 percent of wages for bonuses, social security taxes, workmen's compensation, unemployment insurance, and hospitalization insurance.

^{4/} Includes 19.0 percent of wages for payroll taxes and costs.

of grain and molasses by months are shown in appendix tables 1 and 2. Vitamin A, salt, and alfalfa were charged into cost of ingredients on a pro rata basis.

Cottonseed hulls and meal used in the feed plant come directly from mill production. In this study, hulls and meal were charged into the feed plant at average daily prices received for these products. For example, if 200 tons of hulls were sold for \$3,900 on a given day then the average hull price of \$19.50 a ton was charged for hulls going into the feed plant.

Quantities, prices, and total ingredient costs for hulls and meal on a monthly basis are shown in appendix tables 1, 2, and 3. For example, monthly average prices for hulls in mixed feed ranged from \$20.41 to \$26.84 a ton and averaged \$22.30 for the year, cottonseed meal ranged from \$70.03 to \$75.44 a ton and averaged \$73.57 for the year.

Sacks were charged into the feed plant at the average purchase price--32.25 cents each or \$6.45 a ton for sacked feed. As shown in table 1, separate ledger accounts are kept for sacked sweet feed and sacked 20/80. Bulk sweet feed and bulk 20/80 and 10/90 are included in the mixed feed account.

Cost of sacks for sweet feed and 20/80 was \$6.45 a ton of feed whereas for mixed feed, which is mostly sold in bulk, sack cost averaged \$0.99 a ton.

Table 1 shows the highest gross margins for sacked sweet feed, \$8.21 a ton. Gross margins for sacked 20/80 and mixed feed were \$6.47 and \$5 a ton respectively. The weighted average gross margin for all feed was \$5.58 a ton.

Gross margins were \$1.55 a ton higher for sacked over bulk sales (\$8 price difference less \$6.45 sack cost). However, sacked feed incurs additional costs such as sacking and loading labor, and operating and fixed costs of the sacking and sewing machines.

Monthly average prices for mixed feed (bulk basis) ranged from \$43.66 to \$38.04 a ton and averaged \$40 a ton for the year (appendix table 1). By adding \$8 a ton for sacked basis, the average annual price for mixed feed would have been around \$47 a ton compared to average annual prices of \$48.92 and \$45.43 for sacked sweet feed and sacked 20/80, respectively.

Costs and Expenses

PCOM does not keep feed plant operating costs separate from overall mill operations. Costs used in this study were a combination of estimates provided by mill personnel and estimates derived from mill records and other sources such as Farmer Cooperative Service files.

Operating Labor

Operating labor was divided into two categories, mixer operators and sacking crews. Mixer operators are full-time feed plant employees--the only labor required when bulk feed is being produced. When sacked

feed is being produced, additional men are required for sacking, sewing, and loading. Sacking crews are obtained from the meal room and hull packer locations.

The feed plant operates 6 days a week. Two 8-hour shifts (16 hours a day) are operated from October through May and one 10-hour shift from June through September. Swing men are used to avoid overtime pay.

Two mixer operators are required on the day shift and one on the evening shift. Sacking crews are taken from the meal room as needed.

Total cost for mixer operators during the year was \$21,104.

Mixer operator costs									
Item	: Men	: Hours	: Wage	: Weekly	: Weeks	: Total	: Payroll	: Total	
	: Day	: Week	: rate	: wages		: wages	: costs ^{1/}	: cost	
	---Number---	---	---Dollars---	---	Number	-----Dollars-----	-----	-----	
Oct.-May day shift	2	16	96	2.32	223	35	7,805	--	--
Oct.-May evening shift	1	8	48	2.42	116	35	4,060	--	--
June-Sept. day shift	2	20	120	2.32	278	17	<u>4,726</u>	<u>--</u>	<u>--</u>
Total							16,591	4,513	21,104

^{1/} Payroll taxes and costs, totaling 27.2 percent of wages, included bonuses, 9.6 percent; FICA taxes, 5.2 percent; workman's compensation insurance, 7.8 percent; employee hospitalization insurance, 3 percent; unemployment insurance, 0.6 percent; and food bonuses, 1 percent.

Sacking and loading crews are part-time feed plant employees. Mill personnel estimated that overhead time spent in bringing men from other locations and waiting time between mixes was equal to

approximately one-half the time spent in productive operations. Based on full production capacity of 5 tons of sacked feed per hour, effective production per hour was reduced to 3.33 tons for purposes of calculating sacking labor costs of \$15,891 as follows:

Item	No. of men	Average hourly wage	Total hourly wage	Production per hour	Wages per ton of feed	Total tons	Total wages	Payroll costs ^{1/}	Total costs
		---Dollars---		Tons	Dollars		-----Dollars-----		
Sweet feed	7	2.00	14.00	3.33	4.20	1,983	8,329	--	--
20/80	5	2.00	10.00	3.33	3.00	1,388	<u>4,164</u>	<u>--</u>	<u>--</u>
Total							12,493	3,398	15,891

^{1/} Payroll taxes and costs totaled 27.2 percent of wages.

Supervision

Feed plant operations are under the supervision of the meal room foreman. The charge to the feed plant for his supervision was estimated by mill personnel as \$1,000 a year. In addition, \$1,000 of the general plant superintendent's salary was charged to feed plant operations. Total costs for supervision, including 27.2 percent payroll, taxes, and costs, were \$2,544.

Office and Clerical

Office and clerical salaries were prorated on the basis of time spent on feed plant activity by management, scale men, bookkeepers, and secretaries. Mill personnel estimated a total of \$2,000. Payroll taxes and costs were calculated at 19 percent due to workman's compensation insurance rates. Total, including payroll taxes and costs, was \$2,380.

Electric Power

Electric power consumption was based on connected horsepower of motors used in feed plant operations. The standard conversion formula 1 hp. = 0.75 kilowatts assumes fully loaded motors. However, Rural Electrification Administration engineers considered 1 hp. = 0.65 kilowatts to be a more realistic factor based on actual operating conditions.

The electric rate schedule for PCOM is unusual in that charges are based on kilowatt-hour consumption only, with no charges for demand factors. The first 20,000 kwh a month is broken into blocks from 4 cents to 1.5 cents a kwh with all additional prices at 1 cent a kwh. For practical purposes the rate is 1 cent a kwh.

Cost of power for feed plant operations during 1970-71 was \$1,258, calculated as follows:

Item	: : Hp. 1/	: : Kwh 2/	: : Kwh per : ton of : feed 3/	: : Tons : of : feed	: : Cost 4/						
	Bulk	Sack	Bulk	Sack	Bulk	Sack	Bulk	Sack	Bulk	Sack	Total
Mixed feed	100	115	65	75	6.5	15	8,230	1,682	535	252	787
Sweet feed	70	85	46	55	4.6	11	550	1,983	25	218	243
20/80 mix	55	113½	36	74	3.6	15	550	1,388	20	208	228
Total									580	678	1,258

1/ Shown in appendix table 4.

2/ 1 hp. = 0.65 kwh.

3/ Production of 10 tons an hour for bulk and 5 tons an hour for sacked.

4/ Cost calculated by: Tons of feed x kwh per ton x 1¢.

The cost of power appears low. Past studies show that 1 cent a kilowatt-hour is an unusually low rate being about one-half of the average of other cooperative cottonseed oil mills. In a feed mill study made in 1968, the electric rate used for model plants was 2 cents a kilowatt-hour.^{1/}

Depreciation, Property Taxes, and Insurance

Assets for purposes of estimating depreciation, property taxes, and insurance totaled \$150,000 as follows:

<u>Item</u>	<u>Amount</u>
Building	\$ 25,000
Machinery	50,000
Grain tanks	50,000
Other tanks	<u>25,000</u>
Total	\$150,000

Depreciation totaled \$8,750 per year. This was calculated on a straight line depreciation rate based on 40 year life for the building and tanks and 8 years for machinery.

Insurance was estimated at a composite rate of 86 cents per \$100. This amounted to \$1,290 for the feed mill.

Property taxes are set out separately in the PCOM audit report. The tax rate on land, building, and equipment was \$1.22 per \$100 cost. Property taxes on \$150,000 for the feed mill were therefore estimated as \$1,830.

^{1/} Carl J. Vosloh, Jr., Cost and Economies of Scale in Feed Manufacturing, Economic Research Service, U.S. Dept. Agr., Mktg. Res. Rpt. No. 815.

Repair Parts and Labor

Repair parts were estimated by the General Plant Superintendent to be \$5,000 a year. In addition, he estimated repair labor at approximately \$5,000 which amounted to \$6,360 when 27.2 percent payroll taxes and costs.

Licenses, Miscellaneous, and Interest

License fees for feed manufacture, at 10 cents a ton, amounted to \$1,438 for the year.

Miscellaneous totaled \$900 and included lube and grease, \$400; janitorial supplies, \$100; twine, \$300; and fuel for molasses mixing, \$100.

Average grain inventory was estimated at \$7,800 (200 tons x \$39 a ton). At 6 percent, total interest for the year was \$468.

Net Margins

Net margin before depreciation expense was \$19,844 compared to \$11,094 after depreciation.

Depreciation should be treated as any other cost when considering the feasibility of new or expanded facilities. However, when analyzing operations of existing facilities net margins before depreciation are significant since any return above variable or operating costs is a recovery of original investment.

PROJECTED COSTS AND RETURNS

Utilization of plant capacity is an important factor in analyzing costs and returns. This section discusses feed plant capacity used in 1970-71 and projects costs and returns under higher levels of plant utilization.

Appendix table 5 summarizes daily tonnage by months for 1970-71. The range in daily production was 155 to 2 tons. Average daily production ranged from a high of 66 tons in March to a low of 32 tons in September and averaged 47 tons for the year.

Under present conditions of customer formula mixing and current office hours, the maximum time the feed plant can be operated is 16 hours a day, 6 days a week. Daily capacity for a 16-hour day ranges from 160 tons bulk to 80 tons of sacked feed. Based on 303 operating days (allowance of 10 days for repairs and 52 Sundays), annual capacity ranges from 48,480 tons of bulk to 24,240 tons of sacked feed.

Total tonnage produced in 1970-71 was 14,383 tons of which approximately 9,911 tons or 69 percent was bulk and 4,472 tons or 31 percent was sacked. Using this ratio, production at full capacity would have been 40,960 tons. Therefore, the feed plant was operated at 35 percent capacity in 1970-71.

Using 1970-71 costs shown in table 1 as a base for 35 percent plant utilization, table 2 projects costs for 50 percent, 75 percent, and 100 percent utilization. Costs ranged from \$4.81 a ton at 35 percent utilization to \$2.76 at 100 percent utilization. All costs

Table 2.--Projected costs at various levels of plant utilization

Plant utilization	: 35	: 50	: 75	:: 100
	: percent	: percent	: percent	:: percent
Tons of bulk feed	9,911	14,111	21,166	28,221
Tons of sacked feed	<u>4,472</u>	<u>6,369</u>	<u>9,554</u>	<u>12,739</u>
Total tons	14,383	20,480	30,720	40,960
<u>Fixed costs:</u>				
Mixer operators	\$21,104	\$21,104	\$21,104	\$21,104
Supervision	2,544	2,544	2,544	2,544
Office salaries	2,380	2,380	2,380	2,380
Property taxes	1,830	1,830	1,830	1,830
Insurance	1,290	1,290	1,290	1,290
Depreciation	8,750	8,750	8,750	8,750
<u>Variable costs:</u>				
Sacking crews	15,891	23,432	35,150	46,868
Electric power	1,258	1,791	2,687	3,583
Feed licenses	1,438	2,048	3,072	4,096
Miscellaneous	900	1,287	1,922	2,563
Interest on grain inventory	468	666	999	1,332
<u>Other:</u> ^{1/}				
Repair parts	5,000	5,530	6,420	7,310
Repair labor	<u>6,360</u>	<u>7,034</u>	<u>8,166</u>	<u>9,298</u>
Total	\$69,213	\$79,680	\$96,314	\$112,948
Cost per ton of feed	\$4.81	\$3.89	\$3.14	\$2.76

^{1/} Assumed 75 percent fixed and 25 percent variable costs.

were assumed to be either completely fixed or variable except repair parts and repair labor which were assumed to be 75 percent fixed and 25 percent variable.

Net margins are affected by revenue factors as well as costs. Appendix table 6 gives estimated costs and net margins under various gross margins and production levels. Data from appendix table 6 was used to construct figure 1.

The center line in figure 1 shows the relationship between net margins and plant utilization under an average gross margin of \$5.58 a ton as realized in 1970-71. If ingredients and sack costs are held constant, a price increase of \$1 a ton would increase gross margins and net margins by \$1 a ton under a given level of production. The relationship between net margin and level of plant utilization for a price increase (or increase in gross margin) of \$1 a ton above the 1970-71 price is shown by the upper line. Similarly the lower line shows results of a decrease in price of \$1 a ton.

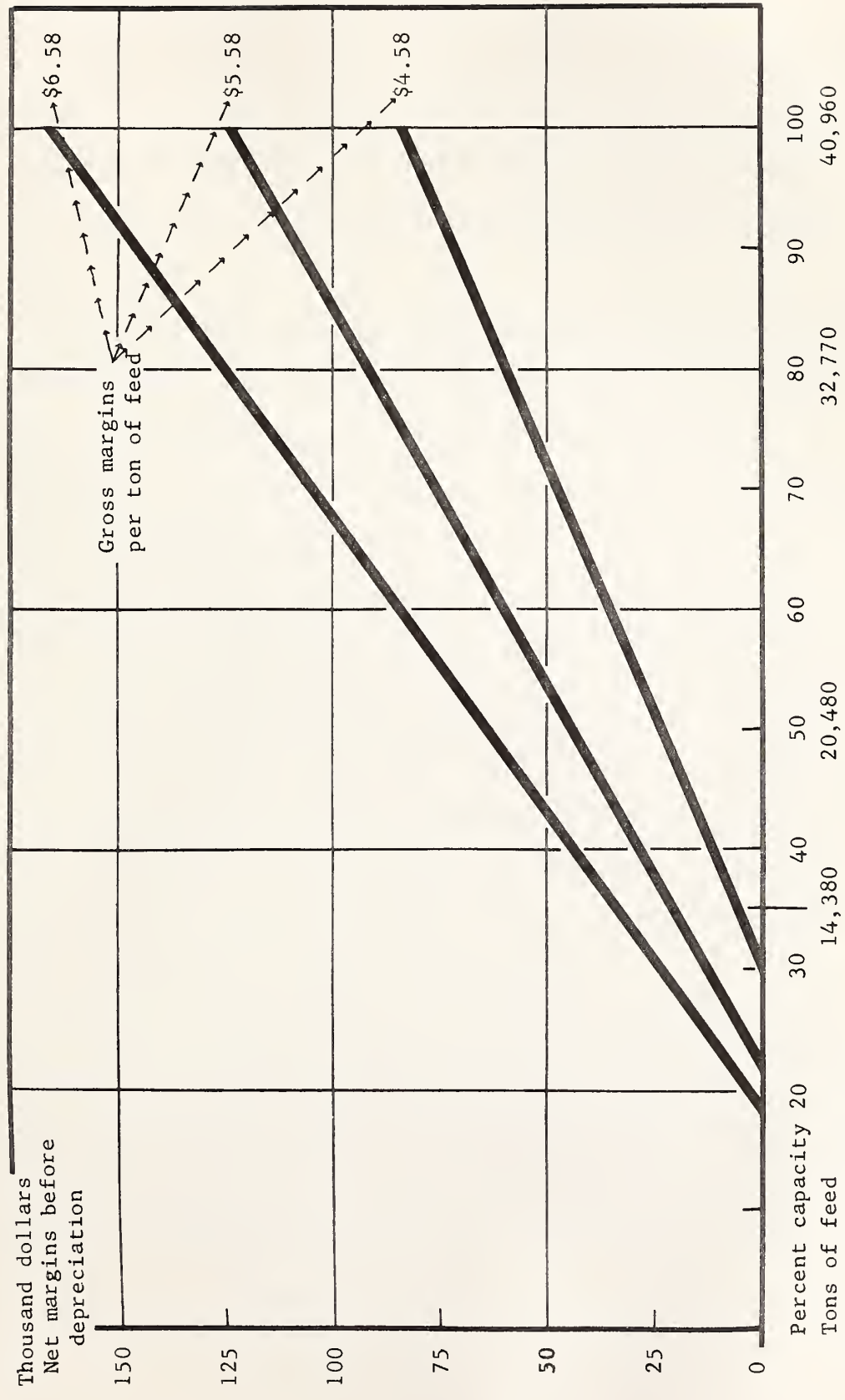
Information shown in figure 1 is useful in projecting the separate and combined effects of pricing and production levels on net margins. For example, assume a decision is made to try to increase sales volume by lowering prices \$1 a ton from the 1970-71 level. What increase in production is necessary to generate the net savings realized in 1970-71? The estimating equation for net margins for a \$1 a ton decrease in price or gross margin is:

$$Y = \$2.92 X - \$36,679$$

where: Y = estimated net earnings

X = tons of feed.

Figure 1.--Estimated net margins before depreciation at various levels of gross margins and plant utilization



Source: Appendix table 6.

By setting Y equal to \$19,844, the net margins before depreciation in 1970-71, the X value becomes 19,359 tons. Therefore, to generate the same net margins with a \$1 a ton decrease in price from 1970-71 would require sales to increase 35 percent from 14,383 to 19,359 tons.

Looking at it from another viewpoint, if the average price of feed were raised \$1 a ton from the 1970-71 level, how many tons would it take to generate the same net margin? The equation in this case is: $Y = \$4.92 X - \$36,679$. By setting Y equal to \$19,844 as in the preceding example the X value becomes 11,489 tons. Therefore, sales could drop from 14,383 to 11,489 tons or 20 percent before net margins would be reduced to the 1970-71 level. If there were no drop in sales when prices were increased by \$1 a ton, net margins would increase from \$19,844 to \$34,085 or by 72 percent.

Unfortunately the information shown in figure 1 cannot be used to estimate gains or losses in sales volume as price is varied. Estimates could be made by a market study but an alternative is to test the market by varying pricing policies.

The degree to which the market should be tested depends upon several factors including satisfaction with level of current net margins and importance of the feed plant as an additional market outlet for hulls and meal, especially hulls. The latter aspect is discussed in the section dealing with other considerations.

If PCOM's goal is to increase level of net margins, one alternative is to put a volume discount pricing policy into effect. For example, feed in lots of less than 5 to 10 tons could be priced \$1 a ton above 1970-71 prices (assuming the same cost of ingredients) with price for larger lots unchanged. Approximately 80 percent of sales in 1970-71 were in lots of less than 5 tons.

It might be advisable to put the volume discount break at 10 tons to assure that the pricing policy would be effective. If customers are purchasing at a discount, then total volume must increase sufficiently to move the production level upward, thereby reducing costs and increasing net margins.

Assuming no change in sales volume and 80 percent of sales in the \$1 a ton higher price range, net savings before depreciation would increase by \$11,506 or from \$19,844 to \$31,350. This was calculated by increasing gross margins by \$1 a ton on 80 percent of 14,383 tons with costs remaining the same.

The extent to which prices are raised depends upon estimates of response of sales volume. Prices could be raised \$2 a ton for lots of less than 10 tons and \$1 a ton for lots over 10 tons but sales might drop off to a point where net margins would decrease. If price increases resulted in too great a sales drop, they could be lowered as soon as this became apparent.

Any action PCOM might decide to take on a pricing policy would need to be kept within any Government price regulations then in effect.

OTHER CONSIDERATIONS

An analysis of feed plant operations at PCOM should take into consideration the effects of this sideline operation on overall mill objectives. Two of the more important factors are importance of feed as a market outlet for cottonseed hulls and meal and service to local farmers and other customers.

In 1970-71 PCOM marketed 6,694 tons of cottonseed hulls and 1,441 tons of cottonseed meal through feed. This accounted for 10 percent and 1 percent of total hull and meal sales, respectively.

A question arises as to what effects, if any, a 10 percent decrease in supply has upon market price of hulls. In years when supply of hulls is relatively low and prices are high, a 10 percent decrease in volume offered for sale may not have any effect on price. However, in other years when supply is relatively high and prices are low, a 10 percent decrease in volume of hulls offered for sale may have a significant effect on price.

For example, assume that in 1970-71 the feed plant was not operated and that the additional hull supply would have brought about a \$1 a ton reduction in hull price. In this case total net margins for overall mill operations would have been reduced \$66,098 (66,098 tons of hulls at \$1 a ton).

The importance of feed sales as a market outlet for hulls cannot be measured without data but should be considered in decisions on whether or not to operate the feed plant and at what level.

Feed sales are not significant as a market outlet for meal since only 1 percent of total meal was marketed through feed.

The possibility of the feed plant providing needed services to local farmers and customers should also be considered. Among the reasons local farmers patronize PCOM could be the desire to do business cooperatively; that feed mixing services either are not available locally or, if available, prices are higher or service is not satisfactory. It would be well to inform patrons of the reasons if feed plant operations are discontinued or price increases put into effect.

APPENDIX

Appendix table 1.--Mixed feed^{1/} Volume, sales, cost of ingredients and sacks, and gross margins, by month, fiscal year ended June 30, 1971

Month	Sales			Ingre-: Sacks :		Gross		Ingredients										Other ^{4/}		
	Price:		Total :	dents:		Total :		Per		Hulls		Grain		Cottonseed meal :		Molasses				
	Tons :	2/ :	3/ :	Total :	cost :	Total :	ton :	Tons :	Price:	Cost :	Tons :	Price:	Cost :	Tons :	Price:	Cost :	Tons :		Price:	Cost :
-----Dollars-----																				
July 1970	744	40.16	30,164	26,421	529	3,214	4.32	443	24.95	11,053	175	39.00	6,825	91	70.61	6,426	35	40.00	1,400	717
August	656	41.81	27,685	24,190	335	3,160	4.82	359	26.84	9,636	181	39.00	7,059	74	70.03	5,182	42	40.00	1,680	633
September	683	41.74	28,777	24,801	619	3,357	4.92	392	25.21	9,882	168	39.00	6,552	84	73.25	6,153	39	40.00	1,560	654
October	666	41.84	28,130	24,798	303	3,029	4.55	395	25.20	9,954	139	39.00	5,421	101	74.75	7,550	31	40.00	1,240	633
November	778	43.66	34,293	28,761	755	4,777	6.14	461	25.37	11,696	173	39.00	6,747	108	75.27	8,129	36	40.00	1,440	749
December	860	40.91	35,513	29,956	1,580	3,977	4.62	501	21.80	10,922	189	39.00	7,371	114	75.44	8,600	56	40.00	2,240	823
January 1971	930	38.86	36,481	31,096	1,013	4,372	4.70	572	20.69	11,835	187	39.00	7,293	121	75.06	9,082	50	40.00	2,000	886
February	985	38.04	37,819	33,319	1,238	3,262	3.31	584	20.53	11,990	209	39.00	8,151	132	74.54	9,839	60	40.00	2,400	939
March	1,283	37.87	49,041	43,114	1,884	4,043	3.15	767	20.65	15,839	264	39.00	10,296	164	74.54	12,225	88	40.00	3,520	1,234
April	1,256	37.64	47,721	41,220	755	5,746	4.57	838	21.13	17,707	183	39.00	7,137	175	72.99	12,773	60	40.00	2,400	1,203
May	1,193	40.79	49,118	39,219	1,090	8,809	7.38	759	21.17	16,068	211	39.00	8,229	148	72.85	10,782	75	40.00	3,000	1,140
June	978	40.37	39,854	31,798	748	7,308	7.47	623	20.41	12,715	167	39.00	6,513	129	71.87	9,271	59	40.00	2,360	939
Total	11,012	--	444,596	378,693	10,849	55,054	--	6,694	--	149,297	2,246	--	87,594	1,441	--	106,012	631	--	25,240	10,550
Weighted average	--	40.00	--	--	--	--	5.00	--	22.30	--	--	39.00	--	--	73.57	--	--	40.00	--	--

^{1/} Includes approximately 90 percent customer formula feed and 10 percent bulk sweet feed, 20/80 and 10/90 mixes.

^{2/} Bulk price. To convert bulk price to sack price add \$8 a ton.

^{3/} Includes sacks. Approximately 15 percent of mixed feed sold in sacks.

^{4/} Includes vitamin A, salt, and alfalfa. Purchases for the year prorated monthly by tons of feed produced.

Appendix table 2.--Sacked sweet feed: Volume, sales, cost of ingredients and sacks, and gross margins, by month, fiscal year ended June 30, 1971

Month	Sacked sales				Ingre- dients				Gross margins				Hulls				Ingredients				Meal				Molasses			
	Price ^{1/}		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total		Total					
	Tons	Price ^{1/}	Total	cost	Tons	Price	Total	cost	Tons	Price	Total	cost	Tons	Price	Total	cost	Tons	Price	Total	cost	Tons	Price	Total	cost				
-----Dollars-----																												
July 1970	126	\$47.64	\$ 6,003	\$ 4,481	\$ 813	\$ 709	\$ 5.63		88	\$24.95	\$ 2,196	25	\$70.61	\$ 1,765	13	\$40.00	\$ 520											
August	121	49.29	5,964	4,442	780	742	6.13		85	26.84	2,281	24	70.03	1,681	12	40.00	480											
September	99	50.39	4,989	3,604	639	746	7.54		69	25.21	1,739	20	73.25	1,465	10	40.00	400											
October	127	51.09	6,489	4,632	819	1,038	8.17		89	25.20	2,243	25	74.75	1,869	13	40.00	520											
November	99	50.77	5,026	3,656	639	731	7.38		69	25.37	1,751	20	75.27	1,505	10	40.00	400											
December	136	48.74	6,628	4,668	877	1,083	7.96		95	21.80	2,071	27	75.44	2,037	14	40.00	560											
January 1971	221	47.44	10,485	7,390	1,425	1,670	7.56		155	20.69	3,207	44	75.06	3,303	22	40.00	880											
February	167	47.96	8,009	5,542	1,077	1,390	8.32		117	20.53	2,402	33	74.54	2,460	17	40.00	680											
March	312	46.39	14,475	10,451	2,012	2,012	6.45		218	20.65	4,502	63	74.74	4,709	31	40.00	1,240											
April	226	48.89	11,049	7,525	1,458	2,066	9.14		159	21.13	3,360	45	72.99	3,285	22	40.00	880											
May	200	51.51	10,302	6,678	1,290	2,334	11.67		140	21.17	2,964	40	72.85	2,914	20	40.00	800											
June	149	50.99	7,598	4,879	961	1,758	11.80		104	20.41	2,123	30	71.87	2,156	15	40.00	600											
Total	1,983	--	\$97,017	\$67,948	\$12,790	\$16,279	--	\$ 8.20	--	\$22.22	--	\$30,839	396	--	\$29,149	199	--	\$7,960										
Weighted average	--	\$48.92	--	--	--	--	--	\$ 8.20	--	\$22.22	--	--	--	\$73.61	--	--	\$40.00	--							--			

^{1/} Sacked price \$8 a ton over bulk price.

Appendix table 3.--Sacked 20/80 mix: Volume, sales, cost of ingredients and sacks, and gross margins, by month, fiscal year ended June 30, 1971

Month	Sacked sales			:Ingred.:			:Gross margins:			Ingredients			
	: Price : Total		: Total :Sacks	: Total : Per :		: Hulls	: Price : Cost :Tons		: Price : Cost				
	: Tons :	l/ :		: cost :	: ton :		:Price :	: Cost :					
-----Dollars-----										-----Dollars-----			
July 1970	63	44.76	2,820	2,165	406	249	3.95	50	24.95	1,247	13	70.61	918
August	59	46.44	2,740	2,101	380	259	4.39	47	26.84	1,261	12	70.03	840
September	53	46.06	2,441	1,865	342	234	4.42	42	25.21	1,059	11	73.25	806
October	106	45.09	4,780	3,712	684	384	3.62	85	25.20	2,142	21	74.75	1,570
November	111	46.23	5,131	3,914	716	501	4.51	89	25.37	2,258	22	75.27	1,656
December	99	43.83	4,339	3,231	639	469	4.74	79	21.80	1,722	20	75.44	1,509
January 1971	156	43.60	6,802	4,913	1,006	883	5.66	125	20.69	2,586	31	75.06	2,327
February	143	43.39	6,205	4,502	922	781	5.46	114	20.53	2,340	29	74.54	2,162
March	194	43.71	8,479	6,116	1,251	1,112	5.73	155	20.65	3,201	39	74.74	2,915
April	121	46.97	5,683	3,802	780	1,101	9.10	97	21.13	2,050	24	72.99	1,752
May	197	48.04	9,464	6,186	1,271	2,007	10.19	158	21.17	3,345	39	72.85	2,841
June	86	48.59	4,179	2,630	555	994	11.56	69	20.41	1,408	17	71.87	1,222
Total	1,388	--	63,063	45,137	8,952	8,974	--	1,110	--	24,619	278	--	20,518
Weighted average	--	\$45.43	--	--	--	--	\$6.47	--	\$22.18	--	--	\$73.81	--

1/ Sacked price \$8 a ton over bulk price.

Appendix table 4.--Connected horsepower of electric motors in feed plant

Item	Mixed feed	Sweet feed	20/80 mix
<u>Horsepower</u>			
Convey grain to grinder	10	--	--
Grain grinding	15	--	--
Molasses mixer	15	15	--
Convey ingredients to formula mixer:			
Grain	5	--	--
Meal	5	5	5
Hulls	7½	7½	7½
Formula mixer	20	20	20
Elevator from formula mixer to overhead bin	15	15	15
Bulk loading conveyor	<u>7½</u>	<u>7½</u>	<u>7½</u>
Total for bulk operations	100	70	55
Operations through overhead bin from formula mixer	92½	62½	48½
Conveyor to sacker	7½	7½	<u>1/30</u>
Sacker	<u>15</u>	<u>15</u>	<u>35</u>
Total for sack operations	115	85	113½
<u>1/ 20/80 mix sent to hull packer sacker at other end of meal building.</u>			

Appendix table 5.--Feed production: Daily tonnage by monthly summary,
1970-71

Month	: All			: Mixed			: Sacked			: Sacked		
	: feed			: feed ^{1/}			: sweet feed			: 20/80		
	:High:	Low:	Ave.:	:High:	Low:	Ave.:	:High:	Low:	Ave.:	:High:	Low:	Ave.:
	Tons											
July 1970	62	14	35	55	5	28	20	<u>2/</u>	5	9	<u>2/</u>	3
August	70	8	33	66	3	26	21	<u>2/</u>	5	9	<u>2/</u>	3
September	95	9	32	87	2	27	15	1	4	9	<u>2/</u>	2
October	61	12	35	51	6	26	16	1	5	10	<u>2/</u>	4
November	95	4	41	90	4	32	16	<u>2/</u>	4	20	<u>2/</u>	5
December	93	2	42	77	11	34	14	1	5	11	<u>2/</u>	4
January 1971	155	3	50	111	7	37	30	1	9	22	1	6
February	97	31	56	92	17	43	23	1	7	16	<u>2/</u>	6
March	117	30	66	104	18	48	30	3	11	17	1	7
April	117	32	64	93	23	50	23	2	8	16	<u>2/</u>	5
May	124	30	64	94	22	48	20	1	8	32	<u>2/</u>	8
June	92	19	49	70	11	39	18	<u>2/</u>	6	24	<u>2/</u>	4
Average	--	--	47	--	--	36	--	--	6	--	--	5

^{1/} Averages approximately 90 percent bulk and 10 percent sacked.

^{2/} Less than .5 ton.

Appendix table 6.--Projected net margins at various prices and levels of production

Item	Plant capacity used									
	35 percent		50 percent		75 percent		100 percent			
	-\$1 : 1970-71: ton : price :	+\$1 : 1970-71: ton : price :	-\$1 : 1970-71: ton : price :	+\$1 : 1970-71: ton : price :	-\$1 : 1970-71: ton : price :	+\$1 : 1970-71: ton : price :	-\$1 : 1970-71: ton : price :	+\$1 : 1970-71: ton : price :	-\$1 : 1970-71: ton : price :	+\$1 : 1970-71: ton : price :
Feed production	-----14,383 tons-----	-----20,480 tons-----	-----30,720 tons-----	-----40,960 tons-----						
Average gross margin (per ton)	\$4.58	\$5.58	\$6.58	\$4.58	\$5.58	\$6.58	\$4.58	\$5.58	\$6.58	\$6.58
Costs before depreciation (per ton)	<u>4.20</u>	<u>4.20</u>	<u>4.20</u>	<u>3.46</u>	<u>3.46</u>	<u>3.46</u>	<u>2.86</u>	<u>2.86</u>	<u>2.55</u>	<u>2.55</u>
Net margin before depreciation (per ton)	.38	1.38	2.38	1.12	2.12	3.12	1.72	2.72	3.72	4.03
Depreciation (per ton)	<u>.61</u>	<u>.61</u>	<u>.61</u>	<u>.43</u>	<u>.43</u>	<u>.43</u>	<u>.28</u>	<u>.28</u>	<u>.21</u>	<u>.21</u>
Net margin after depreciation (per ton)	(.23)	.77	1.77	.69	1.69	2.69	1.44	2.44	3.44	3.82
Net margin before depreciation	5,466	19,844	34,232	22,938	43,418	63,898	52,838	83,558	114,278	165,069
Net margin after depreciation	(3,308)	11,094	25,458	14,131	34,611	55,091	44,237	74,957	105,677	156,467

